through our NSF-sponsored Research Experience for Undergraduates program entitled Internships in Nanosystems Science Engineering and Technology (INSET). Since its inception in 2002, INSET has raised the profile of CC student researchers at our institution, the University of California Santa Barbara, and has offered a number of biophysics research projects each year. We argue that key components of INSET success are: 1) the involvement of CC faculty with a strong interest in promoting student success in all aspects of program planning and execution; 2) the design of activities that provide the level of support that students might need because of lack of confidence and/or unfamiliarity with a university environment, while setting clear goals and high performance expectations.The INSET program has been a successful template for the creation of other CC-university partnerships at our campus, which encourage and support the advancement of CC students as they transfer on to 4-year institutions in STEM fields. We conclude by offering this successful model for university/community college partnerships, which can be implemented at other institutions.

2731-Pos Board B750
Instances: Incorporating Computational Scientific Thinking Advances into Education & Science Courses

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Teaching computation and science in the context of scientific inquiry and problem solving promotes interest in STEM and increases appreciation for computation in science. The work presented here is the result of multi-institutional and multi-disciplinary collaboration among Computational Physics educator, Science & Math educator, Computational Science Education foundation, Computational Biologist, two community college science teachers, and CS usability expert.

We have created a collection of modules that have been piloted in a pre-service education course and are currently being modified for use in an online course for pre- and in- service teachers. The Computational Scientific Thinking & Modeling course will provide practical computation integrated into the scientific problem-solving paradigm. We assume that the students have varied knowledge of physics, biology, algebra, and Calculus1 at a high school level. The following module topics have been selected for the online course: Exponential Decay and Growth, Logistic Growth, Computer Precision, Predator Prey Models, Projectile Motion with Drag, Random Numbers, Random Walk. Students learn to create models and perform computations using Excel, Python language or Vensim simulation software. Our modules start with a scientific problem and then lead the students through its solution via a computational science approach. A typical module includes: Learning Objectives/Skills/Activities, Scientific problem, Concept map and system statements, Computational model, Background information on the computational model, Simulating the model, and Assessment.

We found that the module topics are easily described in the context of physical examples. Yet biological examples are less obvious. The pilot of the Exponential Decay and Growth and Logistic Growth revealed that the science was masked in the process of learning the software and the students desired a greater understanding of computation in science. In this poster we present the modules that have been piloted.

2732-Pos Board B751
Teaching Introductory Stem with the Marble Game

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Recently there has been a call for curricular reform to plot a ''learning progression'' for students through the curriculum. In response, I offer the Marble Game. It provides a conceptual framework for quantitative scientific modeling skills that are useful across the science, technology, engineering and math (STEM) disciplines - at many levels. The approach actively engages students in a process of directed scientific discovery. In a SALG survey, students identified this approach as producing ''great gains'' in their understanding of real world problems and scientific research. Students build a conceptual framework that applies directly to random molecular-level processes in biology such as diffusion and interfacial transport. It is also isomorphic with a reversible first-order chemical reaction providing conceptual preparation for chemical kinetics. The computational and mathematical framework can also be applied to investigate the predictions of physics topics ranging from Newtonian mechanics (addressing student misconceptions by using a process of scientific discovery) through RLC circuits. To test this approach, students were asked to derive a ***novel*** theory of osmosis. The test results confirm that they were able to successfully apply the conceptual framework to a new situation under final exam conditions. DUE-0836833 http://circle4.com/biophysics

2733-Pos Board B752
Contemporary PBSB: Modular Graduate Education in Cells, Systems, and Quantitative Methods

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Physiology and biophysics contributes to both graduate (Ph.D.) and medical (M.D.) education. The goals and curricula differ, but faculty, facilities, and educational tools are shared.

Last year we introduced (Gardner et al, Biophys.J. 102:210a,2012) Membranes, Ions, and Signals, our new modular biophysics unit for first-year medical students. We now report a new year-long modular course to prepare first-year Ph.D. students for twenty-first century research in the function, analysis, modeling, and understanding of living systems: Contemporary Physiology, Biophysics, and Systems Biology (CPBSB). With Departmental support, two dozen faculty were able to shape design within three months, toward introduction in September 2012.

Multiscale and translational examples develop conceptual skills necessary to design meaningful experiments, derive insight from journal reports, work within research groups, and communicate findings. Quantitative and computational methods are central, integrated, and rigorous; structural and developmental concepts are covered as they illuminate function.

Organization is modular: six semi-independent multi-week modules that form a coherent whole. Typical weeks include two in-depth lecture-conferences combining core material with student participation, and one computational analysis, model, or journal-club paper.

Initial modules cover essentials:
CPBSB1: Membranes and cells
CPBSB2: Protein function signaling and synthesis
CPBSB3: Control and communication in bodies and brains
Two modules build on fundamentals: one focuses on an organ system; another on an informative set of computational tools:
CPBSB4: Action and mechanical work from biochemical energy,
CPBSB5: Introduction to computational systems biology.
The concluding module:
CPBSB6: Physiology of Systems and Diseases, integrates lecture/conferences, problem-based learning, and journal clubs toward problem solving. Some weeks offer translational correlates of ideas and tools from the five preceding modules; others follow an investigative thread toward relating questions and techniques. Assessments and student feedback are obtained following each module.

2734-Pos Board B753
Poetic Science: Enriching the Biophysics and Systems Biology Experience

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Science and poetry are often thought of as mutually exclusive. Yet, sometimes they coexist as parallel lanes on a one-way street. In pursuit of scientific discovery, driven by intellectual curiosity and a passion to smooth the path for those in need, one can allow thoughts about science to coincide with a tendency to express oneself through poetry. An aesthetic overlap results that informs and mediates understanding of science. Expression of science in the form of poetry nurtures a creative environment for research. This leads to an enriched imagining of how the science might work. One finds oneself more deeply probing literature searches, which broadens the scope of the research findings and expands the context for interpretation of results. Ultimately, one's thoughts are a bus driver that stops at several locations, picking up and letting off passenger ideas. The ideas interact with each other in the poetry bus, while being thoughtfully transported to their final destination. using this technique, one learns and comes to understand more how biological processes resemble social processes, and how social experiences define our search in biology. Such analysis enriches the biophysics experience and facilitates learning. Writing poems about science and research can add profound depth and breadth to biophysics and systems biology education. Every student at any level should pursue creative passions outside of science and be open to collaboration between learning science and expression through various media.